STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 03-IEP-01, 02-REN-1038,
	)	And 04-DIST-GEN-1
Informational Proceeding and	)	NOTICE OF COMMITTEE WORKSHOP
Preparation of the 2004 Integrated	)	RE: Accelerated Renewable Energy
Energy Policy Report (IEPR) Update	)	Development (Renewable
_____	)	Distributed Generation)

Reply Comments of Pacific Gas and Electric Company
On Questions Asked At The June 8, 2004 Committee Workshop On
Renewable Distributed Generation

Introduction

Pacific Gas and Electric Company (PG&E) appreciates this opportunity to comment on the questions posed by the California Energy Commission in conjunction with the Integrated Energy Policy Report (IEPR) workshop held June 8, 2004. PG&E believes renewable energy can play a significant role in the energy future of California and supports renewable energy as one of the tools that should be available to customers to meet their energy needs. PG&E believes renewable distributed generation can operate consistent a commitment to safe, reliable delivery of energy to customers.

PG&E has taken a variety of steps to support renewable distributed generation. It administers a Self Generation Incentive Program (SGIP) that is has grown substantially over the last few years, and is currently oversubscribed for photovoltaic projects in 2004, although additional reallocations of funding may occur later in the year. The SGIP program has been instrumental in helping many projects go forward, including a $3.4 million rebate for the photovoltaic (PV) systems installed at the California State University at Hayward, a $2.1 million rebate for completion of the photovoltaic arrays atop the Moscone Center; and Sonoma State University projects expected to reduce energy use at the University by 42% through PV and energy efficiency.

PG&E supports net metering and has been actively engaged with other stakeholders in developing workable legislative solutions to California's renewable distributed generation issues. PG&E supported AB 58, which extended the expansion of net metering for both solar and wind customer generators up to 1 MW in size. It also supported AB 2228, which extended net metering to biogas digester projects and AB

1214, which extended net metering to fuel cells. Finally, PG&E supported AB 1685, which extended the Self-Generation Incentive Program through 2007.

PG&E also works with the renewable DG community. PG&E hosted the all-day Solar Forum in May of this year, which had perhaps the largest attendance at any Solar Forum. PG&E also sponsored all-day SGIP workshops in San Francisco and San Ramon, with approximately 250 interested vendors, customers and suppliers attending. In October, PG&E will co-host (with the SFPUC) the SEPA Solar Power 2004 Conference and Trade Show in San Francisco.

PG&E is committed to taking internal and external steps to making renewable generation work for our customers. We actively participate in the Rule 21 workshops to clarify and simplify interconnection requirements. We have instituted an internal process improvement to streamline implementation of both net metering and Rule 21 requirements. We have reduced the interconnection time for simple DG projects – and did it during the time the SGIP program was rapidly expanding. We have published an E-NET newsletter and established a website that includes an on-line application process for the program. PG&E also sponsors a variety of classes and workshops on solar topics at our Pacific Energy Center (PEC), and we are currently developing a new exhibit at the PEC on Distributed Energy Resources with an emphasis on renewable DG.

PG&E is proud of our record in renewable generation and we appreciate the opportunity to provide input to the CEC process. The remainder of these remarks will address the specific questions posed by the CEC.

1. How should state and local programs be coordinated in terms of incentives? How formal or informal should this coordination be?

PG&E supports a high degree of coordination between programs offering incentives for renewable energy projects. For instance, the CEC has been able to respond quickly to changes in the market – reducing the incentive over time to maximize participation without giving too much of available funds to too few projects. The SGIP programs under CPUC oversight have not been able to respond as quickly, contributing – in the case of PG&E – to an over-subscription. Greater coordination might have improved the ability of the SGIP program to respond to market activity. Coordination also fosters better and clearer communication among market participants; reduces the opportunities for double dipping; and could increase efficiencies. Proposals for additional coordination between the CEC and CPUC supervised programs are discussed below in response to Question 2.a.

2.a. In California, are we achieving program goals of bringing about cost reductions so that we are close to reaching the point in time where incentives are no longer necessary?

PG&E, as a Program Administrator for the Self-Generation Incentive Program (SGIP), has <u>not</u> seen an overall reduction in project costs for PV over the previous three-year period since the program began accepting applications on July 3, 2001. PG&E has paid

and reserved PV projects in amounts that approximately total the other three SGIP Program Administrators combined (SCE, SoCalGas and SDREO). The SGIP provides an incentive for 30 kW to 1 MW PV systems of either $4.50 per watt, or 50% of eligible project costs, whichever is less. The system costs and rebate amounts on an average dollar per watt basis under the PG&E SGIP for PV is:

	System Cost Average $ Per Watt		**Rebate Amount Average $ Per Watt**	
Program Year	**Method 1**	**Method 2**	**Method 1**	**Method 2**
2001	$7.74	$8.11	$3.85	$3.99
2002	$8.24	$8.75	$3.92	$4.06
2003	$8.34	$8.84	$4.09	$4.24
2004	$7.83	$8.40	$3.89	$4.15

The details of these calculations are described in the footnotes.[1]

There have been reports in various trade publications and journals of the dramatic increase in world production of PV over this same period of time ("World production of PV increased by a record 43.8% during 2002, with most sales going into the grid-connected sectors in Japan, Germany and the US State of California.")[2] Similarly, it has been reported that PV plants in Japan, which account for approximately half of the world cell/module production, have increased in scale and automation which have significantly reduced operating costs and which should bring about corresponding cost reductions at the wholesale level. Of course, it may be that other factors (e.g., currency exchange rates and continuing demand that exceeds supply), are contributing to a resistance to falling retail PV system prices in PG&E's service territory.

PG&E has recommended that the CPUC immediately reduce the maximum SGIP incentive for PV to match the CEC Emerging Renewables Rebate Program rate of $3.20 per watt (representing a 29% decrease from the $4.50 per watt maximum currently

[1] Method 1 = Total eligible project costs (or rebate amounts) divided by total systems watts.

Method 2 = Average of individual dollar per watt project costs (or rebate amounts).

Notes: a. Watts are defined as the CEC PTC (PVUSA Test Conditions) rating after the inverter efficiency, and b. Projects receiving other rebates (e.g., CEC or SMUD) are excluded from the analysis.

[2] Renewable Energy World, July-August 2003, PV Market Update, Paul Maycock.

offered). Although this reduction would be in line with the reductions made in Japan over a similar period in their program, some believe such a reduction would negatively impact demand for PV in California. Based on historical data collected by the CEC, this fear appears to be unfounded.

The remaining six month period in 2004 presents a unique opportunity to test whether a reduction in incentive would lead to an increase or decrease in the amount of PV being installed. PG&E's SGIP currently has a huge waiting list for PV applications – which continues to grow daily (as of June 11th, it contains 78 projects requesting $47.5 million in incentives), but with some projects dropping out, along with reallocations from other categories, some limited funding is likely to be freed up over the next six months. As projects move off of the waiting list, if they are offered the new, reduced incentive amount currently offered under the CEC program, it would provide an opportunity to see the extent to which vendors and customers are willing to proceed with the reduction in subsidy either shared, or absorbed entirely by one of the parties. If particular applicants on the waiting list are not willing to go forward with the reduced incentive, the next project in the queue can be offered the same rebate amount. Since all SGIP Program Administrators only have limited remaining funding for PV in 2004, any adverse impact on the PV market would be, at worst, very small. PG&E believes it far more likely that the PV market would benefit from such a change, since the overall impact of reducing the incentive level would be to allow more projects to go forward, rather than allowing a small number of projects to exhaust available funds.

2.b. What is the expected outlook in cost reductions for retail purchase of these DG systems?

As explained above, for the larger solar systems, for which PG&E sees the retail costs as a component of our review prior to issuing incentive payments, PG&E has seen no noticeable decline in the retail price of these systems over the short life of this program. In contrast, the conventional wisdom is that the underlying wholesale costs have dropped over time. For example, a recent New York Times article, stated: "Electricity-generating solar panels, which were invented 50 years ago and cost $100 a watt in 1976 now sell for less than $3 a watt, and are expected to continue declining 5 percent annually in cost even if there are no technology breakthroughs." (New York Times, May 29, 2004.)

2.c. What could be done to accelerate reduction in costs of renewable DG technologies? If additional funding is necessary to support renewable DG technologies as costs are declining, how much support should be provided and for how long? What would be the source of funding?

Accelerated cost reductions in the installed price of PV systems will be facilitated most by: i) a competitive marketplace for the purchase, installation and support of renewable DG; ii) additional consumer education regarding the technologies and their associated economics so more informed purchasing decisions can be made; and iii) a declining rebate structure over time as was offered under the Japanese model, and is currently in place under the CEC Emerging Renewables Rebate Program. Although customers in California face a different set of economics in making a PV purchase decision than in

Japan, the fact that the subsidy was able to be eliminated in Japan over a ten-year period could serve as a benchmark.

2.d. What is the strategy of the PV and small wind industry of support from state incentive programs for their technologies is phased out?

PG&E has no comment at this time.

3. Should the state pursue a strategy similar to the German model of providing incentives to produce renewable DG, rather than incentives to install renewable generating systems? If so, how should such a performance-based incentive program be structured and funded? How would the state transition from the current incentive model, which is similar to the Japanese model, to a performance-based model similar to the German model?

PG&E believes that there are a number of benefits to paying an incentive on the actual kWh energy production of a PV system, including:

- Provides an added incentive to PV owners to diligently monitor and make sure their systems are operating and performing as intended over time, delivering the benefits to ratepayers that were initially assumed;
- Provides an added incentive to PV owners to "shop around" ahead of time for the best value when purchasing a PV system in terms of installation, price, and performance;
- Provides some additional assurance that systems installed will remain in place, and not be dismantled, relocated or abandoned (e.g., if the inverter fails after the warranty period and replacement is costly); and
- Rewards "tracker" and other high performance PV systems, which have a higher initial cost, but in return can generate more kWh production.

On the other hand, a performance-based incentive (PBI) would also introduce a number of significant challenges and costs which would have to be addressed and factored in, both from an administrative standpoint (e.g., metering DG output and disbursing payments over many years), as well as the fact that a significant hurdle many customers face in purchasing a PV system is the high initial capital cost, which a rebate revenue stream over many years would not address, unless customers are able to get loans to finance the cost of such systems.

The structure and funding for a PBI arrangement could take a number of forms. It is our understanding that the CEC is currently working on developing a "pilot" PBI for PV systems greater than 30 kW. The details of this development and pilot, along with the German experience, should be a valuable source of information and data. Two PV subsidy approaches (lump sum payment upon installation, and performance-based) could be offered in California over the next year – but with customers required to choose one or the other to avoid "double-dipping." The experience of the CEC PBI pilot, along with a careful assessment of the ongoing costs, should guide any decisions whether or not to make a transition to this approach exclusively in California.

4. Germany and Japan are the world leaders in installing distributed PV generation systems, followed by California. What lessons can California learn from these successes?

One of the biggest lessons is that, for prices of PV to come down at the retail level, a reduction in the subsidy must be made over time. As Tim Tutt's presentation on June 8th showed (see Slide 5), the Japanese program subsidy for PV began at 50% in the first year (1994) and was decreased each year to 12% in 2002, and phased out entirely in 2004. In contrast, the SGIP incentive has remained at the $4.50 per watt (or 50%) level without any reduction over almost a four-year period. As a result (at least based upon PG&E's data), this continued high incentive level appears to have contributed to the installed cost of PV systems (between 30 kW and 1 MW) remaining constant.

5.a. Should the caps or expectations on these policies be re-examined in light of the strong recent demand? What opportunities and problems would this be likely to create?

There should be no further augmentation of SGIP subsidies, or increase to the net metering aggregate MW cap, until a benefit-cost study conducted from the perspective of other ratepayers has been completed. If net metering programs are found to be the least-cost/best fit option to meet needs of other ratepayers, then continued encouragement and expansion of net metering can be considered. Until and unless this is found to be the case, there should be no expansion of eligibility to other technologies and no increase in the cap on aggregate participation.

The Legislature included the cap in AB 58 for a reason, namely to limit the total amount of cost-shifting to non-participating utility customers caused by the net metering program. Without some demonstration that subsidization of solar and wind energy is cost-effective from the perspective of other ratepayers, further expansion of the program and the subsidy would be unfair to those non-participants.

5.b. What is the status of net metering in California? Which utilities are coming close to the cap? When do they expect to reach it? What policies are they planning to adopt once the cap is reached?

PG&E has an extremely healthy net metering program, primarily due to the success of the CEC and SGIP incentive programs; the improved interconnection processes within PG&E; the ongoing efforts by the Rule 21 working group streamline and simplify all interconnections; and the many financial advantages that accrue to customers who install renewable generation for on-site use. The net metering program at PG&E has not approached the aggregate MW cap to date; therefore we have developed no policies to address that eventuality.

5.c. Should incentives be adopted to encourage utilities to allow additional net metering beyond the cap set in AB 58? What type/level of incentives would you recommend?

PG&E has no comment at this time.

5.d. Should the state's solar tax credit be extended beyond 2005? If so, how should this credit be structured? Would passage of a federal tax credit affect continuation of a state tax credit?

PG&E has no comment at this time.

5.e. Is there any near-term necessity to examine the exemption from CRS of some distributed renewable generation installations in light of the CRS caps?

The overall CRS cap is 3000 MW. The CEC web site says that currently, there are less than 150 MW of DG on line eligible for a full or partial exemption, with over 2850 MW left to go. See CEC data at http://www.energy.ca.gov/exit_fees/megawatt_cap.html. Given these low figures, there is no need to examine this exemption due to this cap any time soon.

6. How should the state establish a program to foster installation of solar systems on new homes built in California? In particular: 6.a.) What should the near-term and long-term goals be for solar on new homes? Should the state establish numerical targets for these goals? 6.b.) Should mandates, incentives, or some other strategy be used to foster solar on new homes? 6.c.) What are the opportunities and barriers to increasing the market penetration of solar systems on new homes in California? 6.d.) To what extent would it be appropriate to modify California building codes to require new buildings to be solar ready? Should solar on new homes be mandated; if so, at what level, size, or percentage? What are the consequences of having a mandate for solar on new homes? Under what circumstances should a PV system qualify for compliance credits in meeting the building energy efficiency standards? What are the consequences of such a credit? 6.e.) What role can investor-owned utilities and municipal utilities play in delivering solar on new homes in their service areas? 6.f.) What role can builders play in delivering solar on new homes to their customers? 6.g.) How should a program for solar on new homes be coordinated with existing incentive programs, if at all?

Both the Governor's energy policy and recently introduced legislation (SB 1652) contemplate adding solar PV projects to significant amounts of new residential construction, in order to promote environmentally friendly energy solutions to the state's continued need for new electricity resources.

Although the aggregated impacts on distribution planning, operations, and reliability resulting from widespread installation of these customer-owned PV projects are as still very much unknown, we are slowly gaining an understanding of the impacts. PG&E has over 3,000 small customer PV systems integrated into our grid, and has at least one small subdivision with a noticeable concentration of net-metered PV customers in a single location.

PG&E has not yet interconnected any new subdivisions in which all the houses have PV systems, but anticipates that such a subdivision will require a very atypical distribution system design, since power will likely need to flow in different directions at different

times of the day. Although we cannot say at this time whether this alternative design would add significant extra costs when compared to the other costs builders or other ratepayers would bear when developing a solar subdivision, we hope to learn from current research in this area, such as the Distributed Utility Integration Test (DUIT) project with which we are involved and co-funding, along with the CEC and others. The DUIT project, launched in August 2003, will study the short and long term impacts of small power production on utility distribution systems.

There are many other issues that would need to be addressed if the state adopts a mandate to include solar in some or all new homes. These include what would happen if the new subdivision or a particular home is located in an area where solar is not really practical, including many north facing locations, or homes in wooded locations that receive very little direct sunlight. Anther issue is whether the developers will be required to provide a warranty on the solar system, since presentations at the June 8th workshop suggested that some inverters need to be replaced long before the solar panels, but some customers simply do not replace the inverters when they break. Given that many issues are still unresolved, including the state of knowledge of proper distribution system design and interconnection procedures, PG&E suggests that it may be more appropriate to launch the growth of solar subdivisions through incentives, targets, or goals, rather than mandates -- at least for a few years. Incentives should be structured such that the impacts fall equally on all electric distribution providers, whether they are CPUC-regulated IOUs or publicly-owned utilities, such as municipal utilities and irrigation districts. PG&E feels strongly that a state policy should be applicable statewide, with all electric distribution providers shouldering equal responsibility for its implementation.

We appreciate this opportunity to address these issues.

Respectfully submitted,

LINDA L. AGERTER
RANDALL J. LITTENEKER

By: _____
RANDALL J. LITTENEKER

Pacific Gas and Electric Company
Post Office Box 7442
San Francisco, CA 94120
Telephone: (415) 973-2179
Facsimile: (415) 973-9271
E-mail: rjl9@pge.com

Attorneys for
PACIFIC GAS AND ELECTRIC COMPANY

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